Claims:

1.   A media converter for converting from one type
of media to another, comprising:

a first physical-layer interface to a first
transmission medium;

5   a second physical-layer interface to a second
transmission medium;

a memory connected between the first and second
physical-layer interfaces, for temporarily storing data to be
transferred between the first and second physical-layer

10   interfaces;

a determiner for determining whether a received
block of data stored in the memory includes predetermined data
at a predetermined position of the received block of data; and

a controller controlling such that, when it is

15   determined that the received block of data stored in the memory
includes the predetermined data, a response block of data
corresponding to the received block of data is sent from a
corresponding one of the first and second physical-layer
interfaces back to a source that has transmitted the received

20   block of data.

2.   The media converter according to claim 1, wherein
each of the received and response blocks of data is an Ethernet

packet having a predetermined format.

3.   The media converter according to claim 2, wherein the predetermined data is stored in a source address field of the received block of data.

5   4.   The media converter according to claim 1, wherein the predetermined data is an identification number uniquely assigned to the media converter.

5.   The media converter according to claim 2, wherein the predetermined data is an identification number uniquely
10   assigned to the media converter.

6.   The media converter according to claim 1, wherein each of the first and second physical-layer interfaces supports MII (Media Independent Interface) conforming to IEEE802.3 standards.

15   7.   The media converter according to claim 6, wherein when it is determined that the received block of data stored in the memory includes the predetermined data, the controller accesses another one of the first and second physical-layer interfaces to acquire link information from the other
20   physical-layer interface and generates the response block of data corresponding to the link information.

8.   The media converter according to claim 6, wherein
the controller has a missing link function such that, when one
of the first and second physical-layer interfaces comes into
link disconnection, the other one of the first and second

5   physical-layer interfaces also comes into link disconnection.

9.   The media converter according to claim 8, wherein,
when it is determined that the received block of data stored
in the memory includes the predetermined data under missing link
state, the controller disables the missing link state to

10   transmit the response block of data back to the source.

10.   The media converter according to claim 8, wherein,
when it is determined that the received block of data stored
in the memory does not include the predetermined data
under missing link state, the controller switches its

15   operation mode from the missing link state to a normal mode to
transfer the received block of data to the other one of the first
and second physical-layer interfaces.

11.   A control method for controlling a media converter
comprising:

20   a first physical-layer interface to a first
transmission medium;

a second physical-layer interface to a second

transmission medium; and

a memory connected between the first and second physical-layer interfaces, for temporarily storing data to be transferred between the first and second physical-layer

5   interfaces,

the control method comprising the steps of:

a) determining whether a received block of data stored in the memory includes predetermined data at a predetermined position of the received block of data; and

10   b) when it is determined that the received block of data stored in the memory includes the predetermined data, generating a response block of data corresponding to the received block of data; and

c) transmitting the response block of data from a

15   corresponding one of the first and second physical-layer interfaces back to a source that has transmitted the received block of data.

12.   The control method according to claim 11, wherein the predetermined data is an identification number uniquely

20   assigned to the media converter.

13.   The control method according to claim 11, wherein each of the first and second physical-layer interfaces supports MII (Media Independent Interface) conforming to IEEE802.3 standards.

14.   The control method according to claim 13, wherein the step (b) comprises the steps of:

when it is determined that the received block of data stored in the memory includes the predetermined data, accessing another one of the first and second physical-layer interfaces to acquire link information from the other physical-layer interface; and

generating the response block of data corresponding to the link information.

15.   A control method for controlling a media converter comprising:

a first physical-layer interface to a first transmission medium;

a second physical-layer interface to a second transmission medium; and

a memory connected between the first and second physical-layer interfaces, for temporarily storing data to be transferred between the first and second physical-layer interfaces, wherein each of the first and second physical-layer interfaces supports MII (Media Independent Interface) conforming to IEEE802.3 standards,

the control method comprising the steps of:

a) determining whether a received block of data stored in the memory includes predetermined data at a

predetermined position of the received block of data;

    b) when it is determined that the received block of data stored in the memory includes the predetermined data, generating a response block of data corresponding to the

5 received block of data;

    c) determining whether the media converter is in a missing link state such that, when one of the first and second physical-layer interfaces comes into link disconnection, the other one of the first and second physical-layer interfaces also

10 comes into link disconnection; and

    d) when it is determined that the received block of data stored in the memory includes the predetermined data under missing link state, disabling the missing link state to transmit the response block of data from a corresponding one

15 of the first and second physical-layer interfaces back to a source that has transmitted the received block of data.

    16.   The control method according to claim 15, further comprising the step of:

    when it is determined that the received block of data

20 stored in the memory does not include the predetermined data under missing link state, disabling the missing link state to transfer the received block of data to the other one of the first and second physical-layer interfaces.

    17.   The control method according to claim 15, wherein

each of the received and response blocks of data is an Ethernet
packet having a predetermined format.

18. The control method according to claim 15, wherein
the predetermined data is an identification number uniquely
5   assigned to the media converter.

19. A method for detecting a failure on a link including
a plurality of media converters, each of which converts from
one type of media to another, comprising the steps of:
        a) transmitting a block of data to each of the media
10 converters, the block of data having identification data of
the media converter written in a predetermined position of the
block of data;
        b) determining whether a response block of data is
received from a corresponding media converter within a
15 predetermined time period; and
        c) determining a location of a failure based on a
determination result of the step (b).

20. The method according to claim 19, wherein, in the
step (c), when a response block of data is not received from
20 a corresponding media converter within a predetermined time
period, it is determined that a failure occurs at a location
beyond the corresponding media converter.

21.   The method according to claim 19, wherein each of the media converters comprises:

a first physical-layer interface to a first transmission medium;

5   a second physical-layer interface to a second transmission medium; and

a memory connected between the first and second physical-layer interfaces, for temporarily storing data to be transferred between the first and second physical-layer

10   interfaces,

the method further comprising the steps of:

at the media converter,

determining whether a received block of data stored in the memory includes the identification data of its own at

15   a predetermined position of the received block of data;

when it is determined that the received block of data stored in the memory includes the identification data, generating a response block of data corresponding to the received block of data; and

20   transmitting the response block of data from a corresponding one of the first and second physical-layer interfaces back to a source that has transmitted the received block of data.

22.   The method according to claim 21, wherein each of

25   the first and second physical-layer interfaces supports MII

(Media Independent Interface) conforming to IEEE802.3
standards.

23.   The method according to claim 22, further comprising
the steps of:
      at the media converter,
      when it is determined that the received block of data
stored in the memory includes the identification data of its
own, accessing another one of the first and second
physical-layer interfaces to acquire link information from the
other physical-layer interface; and
      generating the response block of data corresponding
to the link information.

24.   The method according to claim 19, wherein each of
the media converters comprises:
a first physical-layer interface to a first
transmission medium, the first physical-layer interface
supporting MII (Media Independent Interface) conforming to
IEEE802.3 standards;
      a second physical-layer interface to a second
transmission medium, the second physical-layer interface
supporting MII conforming to IEEE802.3 standards; and
      a memory connected between the first and second
physical-layer interfaces, for temporarily storing data to be
transferred between the first and second physical-layer

interfaces,

the method further comprising the steps of:

at the media converter,

a) determining whether a received block of data

5 stored in the memory includes the identification data of its

own at a predetermined position of the received block of data;

b) when it is determined that the received block of

data stored in the memory includes the identification data,

generating a response block of data corresponding to the

10 received block of data;

c) when it is determined that the received block of

data stored in the memory includes the identification data in

a missing link state, disabling a missing link state; and

d) transmit the response block of data to a source

15 that has transmitted the received block of data.

25. The method according to claim 24, further comprising

the step of:

when it is determined that the received block of data

stored in the memory does not include the identification data

20 under the missing link state, disabling the missing link state

to transfer the received block of data to the other one of the

first and second physical-layer interfaces.

26. A system for detecting a failure on a link including

a plurality of media converters, each of which converts from

one type of media to another, comprising:

a test manager connected to one of the media converters,

wherein each of the media converters comprises:

5   a first physical-layer interface to a first transmission medium;

a second physical-layer interface to a second transmission medium;

a memory connected between the first and second

10   physical-layer interfaces, for temporarily storing data to be transferred between the first and second physical-layer interfaces; and

a media converter controller determining whether a received block of data stored in the memory includes the

15   identification data of its own at a predetermined position of the received block of data; when it is determined that the received block of data stored in the memory includes the identification data, generating a response block of data corresponding to the received block of data; and transmitting

20   the response block of data from a corresponding one of the first and second physical-layer interfaces back to a source that has transmitted the received block of data, and

the test manager comprises:

an interface to a network manager; and

25   a test manager controller transmitting a block of data to each of the media converters, the block of data having

identification data of the media converter written in a

predetermined position of the block of data; determining whether

a response block of data is received from a corresponding media

converter within a predetermined time period; and determining

5   a location of a failure based on a determination result.

27.   The system according to claim 26, wherein the

test manager controller determines that a failure occurs at a

location beyond the corresponding media converter when a

response block of data is not received from a corresponding media

10   converter within a predetermined time period.

28.   The system according to claim 26, wherein each of

the first and second physical-layer interfaces supports MII

(Media Independent Interface) conforming to IEEE802.3

standards.

15   29.   The system according to claim 28, wherein the media

converter controller accesses another one of the first and

second physical-layer interfaces to acquire link information

from the other physical-layer interface when it is determined

that the received block of data stored in the memory includes

20   the identification data of its own and generates the response

block of data corresponding to the link information.

30.   The system according to claim 28, wherein the

test manager controller disables the missing link state when a test is started and forces a corresponding physical-layer interface into transmittable state to transmit the block of data to the link.

5   31.   The system according to claim 28, wherein the media converter controller determines whether a received block of data stored in the memory includes the identification data of its own at a predetermined position of the received block of data; generates a response block of data corresponding to the received

10   block of data when it is determined that the received block of data stored in the memory includes the identification data; disables a missing link state when it is determined that the received block of data stored in the memory includes the identification data in the missing link state; and transmits

15   the response block of data to a source that has transmitted the received block of data.

        32.   The system according to claim 31, wherein when it is determined that the received block of data stored in the memory does not include the identification data under

20   the missing link state, the media converter controller disables the missing link state to transfer the received block of data to the other one of the first and second physical-layer interfaces.

33.   A media converter with a test manager for use in a

failure detection of a link composed of a plurality of types

of transmission media, comprising:

a first physical-layer interface to a first

5   transmission medium;

a second physical-layer interface to a second

transmission medium;

a memory connected between the first and second

physical-layer interfaces, for temporarily storing data to be

10   transferred between the first and second physical-layer

interfaces;

a media converter controller determining whether a

received block of data stored in the memory includes the

identification data of its own at a predetermined position of

15   the received block of data; when it is determined that the

received block of data stored in the memory includes the

identification data, generating a response block of data

corresponding to the received block of data; and transmitting

the response block of data from a corresponding one of the first

20   and second physical-layer interfaces back to a source that has

transmitted the received block of data;

an interface to a network manager; and

a test manager controller transmitting a block of

data to each of the media converters, the block of data having

25   identification data of the media converter written in a

predetermined position of the block of data; determining whether

a response block of data is received from a corresponding media

converter within a predetermined time period; and determining

a location of a failure based on a determination result.

34.   A media converter with a test manager for use in a

5   failure detection of a link composed of a plurality of types

of transmission media, comprising:

a plurality of media converter; and

a test manager for managing the media converters,

wherein each of the media converter comprises:

10   a first physical-layer interface to a first

transmission medium;

a second physical-layer interface to a second

transmission medium;

a memory connected between the first and second

15   physical-layer interfaces, for temporarily storing data to be

transferred between the first and second physical-layer

interfaces; and

a media converter controller determining whether a

received block of data stored in the memory includes the

20   identification data of its own at a predetermined position of

the received block of data; when it is determined that the

received block of data stored in the memory includes the

identification data, generating a response block of data

corresponding to the received block of data; and transmitting

25   the response block of data from a corresponding one of the first

and second physical-layer interfaces back to a source that has

transmitted the received block of data, and

     the test manager comprises:

an interface to a network manager; and

5   a test manager controller transmitting a block of data

to each of the media converters, the block of data having

identification data of the media converter written in a

predetermined position of the block of data; determining whether

a response block of data is received from a corresponding media

10   converter within a predetermined time period; and determining

a location of a failure based on a determination result.